

REMARKSStatus of the claims:

With the above amendments, claims 1, 2, and 7 have been amended and claims 5 and 12-14 have been cancelled. Thus, claims 1-4 and 6-11 are pending and ready for further action on the merits. No new matter has been added by way of the above amendments. Support for the amendments to claims 1 and 2 occur at page 10, line 21 to page 11, line 1, and at page 14, line 24 to page 15, line 2.

Abstract

The Examiner has objected to the absence of the abstract. Attached to this response, please find an abstract. Withdrawal of the objection is respectfully requested.

Rejections under 35 USC §112, second paragraph

Claims 12-14 have been rejected under 35 USC §112, second paragraph as being indefinite. The Examiner asserts that the catalyst cannot be defined by the feed oil because the catalyst is independent of the feed. Claims 12-14 have been cancelled so the rejection is moot. Withdrawal of the rejection is respectfully requested.

Rejections under 35 USC §102

Claims 1-7 and 11-14 have been rejected under 35 USC §102(b) as being anticipated by FR '951 (FR 2608941). Claims 12-14 have been cancelled so the rejection is moot with respect to those claims. With respect to the rejection over FR '951 for claims 1-7 and 11, the rejection is traversed for the following reasons.

For the Examiner's benefit, attached to this response, please find a translation of FR '951.

FR '951 discloses that a nitrogenated compound such as ammoniac is contacted with a catalyst during sulfurization (or sulfidization). However, the content of the ammoniac compound is greater than 0.2 % by weight (preferably greater than 0.5 % by weight), which is greater than the content of the organic nitrogen compound in amended claims 1 and 2. See page 7, lines 1-5 of the English translation of FR '951. Further, in Examples 5 and 6 in FR '951, 0.1 % by weight aniline (753 ppm as nitrogen weight) and 0.1% by weight n butylamine (192 ppm as nitrogen weight) are added, respectively. See page 12, lines 3-2 from the bottom and page 13, lines 6-7. Because the gas oil contains 0.015 % by weight nitrogen (150 ppm), as disclosed in Table 2 on page 10, the total nitrogen weight in Examples 5 and 6 amount to 207 ppm and 342 ppm, respectively. In Example 4, the gas oil containing nitrogenated compound, meaning that the total amount

of nitrogen is 100 ppm. Table 2 on page 14 shows that the result of the conversion rate is low in Example 4, which is not preferable. From this result, one of ordinary skill in the art would readily see that the reference teaches or suggests that at least 150 ppm of nitrogen is needed for sulfurization. This is outside the range of the 10 to 100 ppm of an organic nitrogen compound as claimed in the instant claim 1.

Further, the boiling temperatures of aniline and n-butylamine used in Examples 5 and 6 are 184°C and 45°C, respectively, which are out of the range of the organic nitrogen compound, defined in claims 1 and 2 (i.e. greater than 200°C).

Moreover, FR '951 uses a feed oil containing a higher concentration of nitrogen compound than the range of 10 ppm to 100 ppm of organic nitrogen compound claimed in the instant invention. As an example, the feed oil containing 650 ppm (0.065 % by weight) nitrogen is used as shown in Table 1 on page 10.

Thus, FR '951 cannot anticipate the instant invention because it fails to disclose the elements of the instantly claimed invention. The rejection is inapposite. Withdrawal of the rejection is warranted and respectfully requested.

Moreover, the above differences are based on a difference in the object of the two inventions. The object of the FR '951 method is to prevent the hydrocracking catalyst from being deactivated by a cracking reaction, which is

uncontrolled with the catalyst having a strong acid function during sulfurization or sulfidization of the catalyst. See page 4, line 21 to page 5, line 5. In order to achieve the object, the ammoniac content of greater than 0.2 % is necessary for the sulfurization in FR '951. See page 7, lines 3-6. In other words, FR '951 attempts to control the acid point in an activation step with sulfurization.

In contrast, the object of the instant invention is to improve activity following initial deactivation during stable hydrocracking after the sulfurization process. That is, to maintain both high and stable catalyst activity for long periods of time. The aim of the instant invention has been accomplished by contacting the hydrocracking catalyst with an organic nitrogen compound at low concentration, which is in a range of 10 ppm to 100ppm when a feed oil having a low concentration of nitrogen, which is not more than 10ppm, is hydrocracked. For the above reasons, it is respectfully requested that the 35 U.S.C. § 102 rejection over FR '961 be withdrawn.

Rejections under 35 USC §103

Claims 8-10 have been rejected under 35 USC §103(a) as being unpatentable over FR '951 (FR 2668251) in view of Bass 1960 US Patent No. 3,017,161. This rejection is traversed for the following reasons.

Instant Invention

The instant invention relates to a method of hydrocracking hydrocarbon oils, comprising several steps. The first step is pre-contacting a hydrocracking catalyst with a solution containing an organic nitrogen compound in a range of 10 ppm to 100 ppm by nitrogen weight. Second, a step is performed wherein a feed oil substantially comprised of hydrocarbon oils and hydrogen is contacted with the hydrocracking catalyst that has been contacted with the organic nitrogen compound. This step is performed in order to obtain a hydrocarbon oil with a lower boiling point than that of the feed oil wherein the concentration of nitrogen in the feed oil is not more than 10 ppm. The organic nitrogen compound is an organic nitrogen compound having a boiling point that is lower than a 50% distillation temperature of the feed oil and that is higher than 200°C.

Disclosure of FR '951

FR '951 discloses that a nitrogenated compound, such as ammoniac, is contacted with a catalyst during sulfurization or sulfidization. FR '951 also discloses that the content of the ammoniac compound is greater than 0.1% by weight (preferably greater than 0.5% by weight). See page 7, lines 1-5 of the English translation of FR '951.

FR '291 fails to disclose a feed oil containing a concentration of nitrogen compound than the range of 10 ppm to 100 ppm. FR '291 also fails to disclose adding a deactivation catalyst. Further, FR '291 fails to disclose any organic nitrogen compounds that satisfy a boiling point that is lower than a 50% distillation temperature of the feed oil and that is higher than 200°C.

Disclosure of Hass '296

Hass '296 discloses midbarrel fuels that boil primarily between about 300 C and 700 C that are produced from higher boiling feeds containing less than 10 ppm nitrogen by hydrocracking in the presence of controlled amounts of added nitrogen compounds including ammonia or hydrocarbon amines in amounts corresponding to about 5 to about 100 ppm nitrogen.

Hass '296 fails to disclose any organic nitrogen compounds that satisfy a boiling point that is lower than a 50% distillation temperature of the feed oil and that is higher than 200 C.

Removal of the Rejection over FR '951 in view of Hass '296

Applicants assert that the Examiner has failed to make out a *prima facie* case of obviousness with regard to the rejection over FR '951 in view of Hass '296. Thus,

criteria must be met to make out a *prima facie* case of obviousness.

- 1) There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.
- 2) There must be a reasonable expectation of success.
- 3) The prior art reference (or references when combined) must teach or suggest all the claim limitations.

See MPEP §2142 and *In re Vaeck*, 20 USPQ2d 1438 (Fed. Cir. 1991). In particular, the Examiner has failed to meet the third element to make a *prima facie* obviousness rejection. Neither FR '951 nor Hass '296 disclose or suggest using organic nitrogen compounds that satisfy a boiling point that is lower than a 50% distillation temperature of the feed oil and that is higher than 200°C. In particular, FR '951 discloses using aniline and/or n-butylamine, which both have boiling points well below 200°C (which is claimed in claim 1). Hass '296 discloses using ammonia and/or hydrocarbon amines (see the abstract). Hass '296, in Example 3, uses t-butyl amine as an example of the hydrocarbon amine, which has a boiling point well below 200 C (44 C). Thus, neither FR '951 nor Hass '296 disclose or suggest using organic nitrogen compounds that satisfy a boiling point that is lower than a 50% distillation temperature of the feed

all and that is higher than 20°C. Accordingly, the rejection is inappropriate. Withdrawal of the rejection is warranted and respectfully requested.

Conclusion

With the above remarks and amendments, it is believed that the claims, as they now stand, define patentable subject matter such that a passage of the instant invention to allowance is warranted. A Notice to that effect is earnestly solicited.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) respectfully petition(s) for a one (1) month extension of time for filing a reply in connection with the present application, and the required fee of \$110.00 is attached hereto.

If any questions remain regarding the above matters, please contact Applicant's representative, T. Benjamin Schroeder (Reg. No. 50,990), in the Washington metropolitan area at the phone number listed below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02 2349 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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By



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Attachments

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 5 and 12-14 have been canceled.

The claims have been amended as follows:

1. (Amended) A method of hydrocracking hydrocarbon oils, comprising the steps of:

pre-contacting a hydrocracking catalyst with a solution containing an organic nitrogen compound in a range of 10 ppm to 100 ppm by nitrogen weight; and

contacting a feed oil substantially comprised of hydrocarbon oils and hydrogen with the hydrocracking catalyst that has been contacted with the organic nitrogen compound in order to obtain a hydrocarbon oil with a lower boiling point than that of the feed oil wherein the concentration of nitrogen in the feed oil is not more than 10 ppm;

the organic nitrogen compound being an organic nitrogen compound having a boiling point that is lower than a 50% distillation temperature of the feed oil and that is higher than 200°C.

2. (Amended) A method of hydrocracking hydrocarbon oils derived from petroleum comprising the steps of:

contacting a petroleum fraction containing an organic nitrogen compound in a range of 1 ppm to 100 ppm by nitrogen

weight and having a 95% distillation temperature that is lower than the 95% distillation temperature of a feed oil substantially comprised of hydrocarbon oils and that is higher than 200°C with a hydrocracking catalyst wherein the concentration of nitrogen in the feed oil is not more than 10 ppm; and

contacting the feed oil and hydrogen with the hydrocracking catalyst that has been contacted with the petroleum fraction in order to obtain a hydrocarbon oil with a boiling point lower than that of the feed oil.

7. (Amended) The hydrocracking method according to any one of Claims 2[,] or 4[, and 5,] wherein, as a result of contacting the petroleum fraction with hydrocracking catalyst, the hydrocracking catalyst contains 0.01% to 1% by nitrogen weight of the organic nitrogen compound per catalyst weight.